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Incubation of hens eggs.

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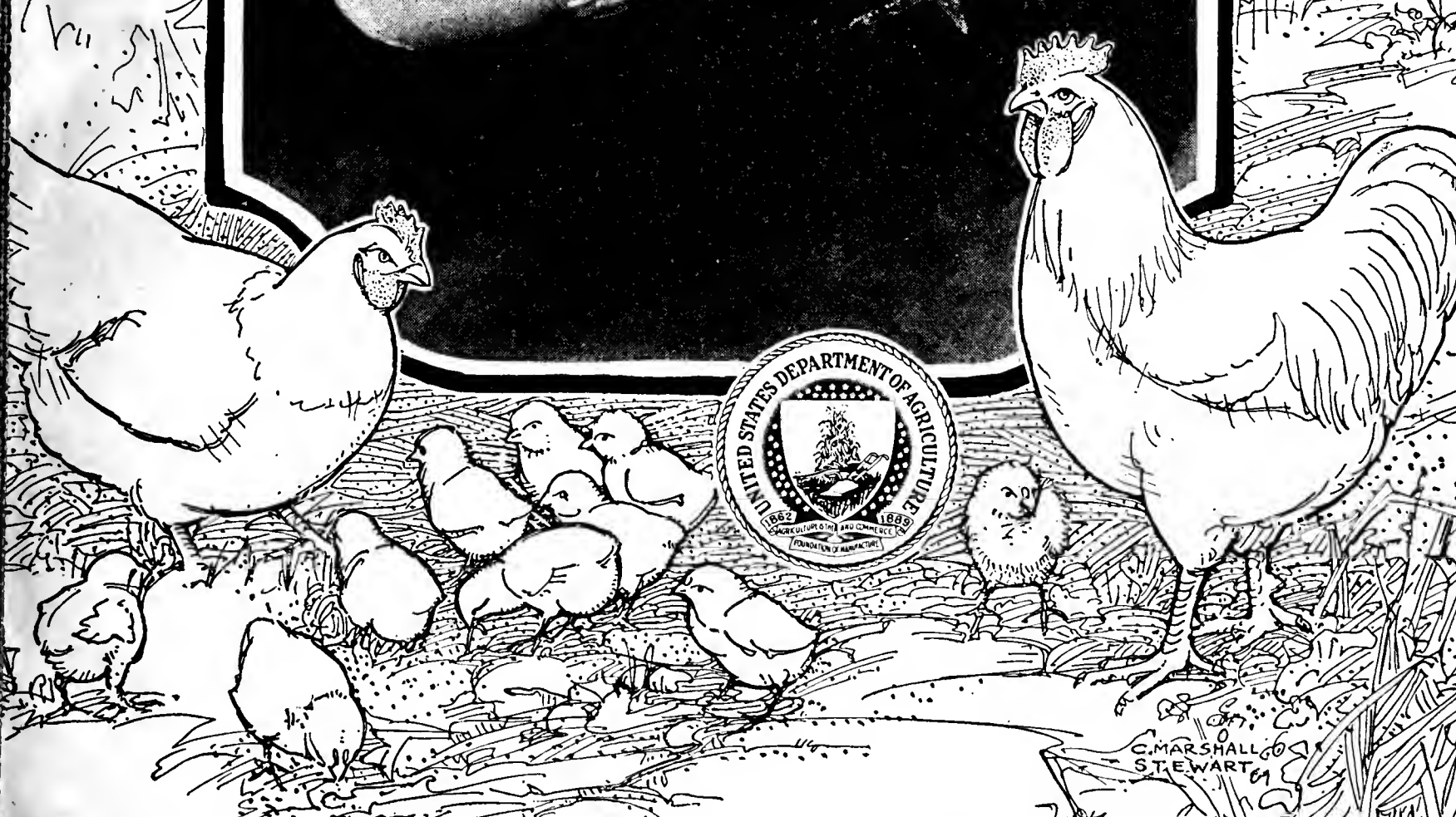
**FARMERS' BULLETIN · 1106**  
UNITED STATES DEPARTMENT OF AGRICULTURE

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**INCUBATION  
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**M**OST BOYS AND GIRLS when joining a poultry club begin their work on a small scale by carrying on their hatching operations with sitting hens. Accordingly, the directions in this bulletin are given for the use of beginners or those wishing to hatch eggs by the natural method.

For information on the artificial incubation of eggs, as well as for additional and more complete information on natural incubation, the reader should ask for Farmers' Bulletin 585, "Natural and Artificial Incubation of Hens' Eggs," which may be obtained in many cases from local club agents or will be sent free of charge on application to the Division of Publications, United States Department of Agriculture, Washington, D. C.

Contribution from the Bureau of Animal Industry

JOHN R. MOHLER, Chief

Washington, D. C.

September, 1920

# INCUBATION OF HENS' EGGS.

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## SELECTION OF EGGS FOR HATCHING.

**F**ERTILE EGGS from vigorous breeding stock are necessary in order to obtain good hatches. The best eggs for hatching are obtained from stock which is properly mated and managed. Free range for the breeders is most desirable for the production of fertile eggs with vigorous germs, and, if possible, members of poultry clubs should give their breeders free range rather than keep them yarded.

Eggs that are abnormally small and poorly shaped should not be used for incubation; neither should eggs that have thin or very porous shells. If possible, eggs should be set when fresh, and it is never advisable to use for hatching eggs that are more than two weeks old. One of the quickest ways to obtain uniformity in the offspring is to select uniformly good-sized eggs of the same color. Dirty eggs or those badly soiled should not be used. Those slightly soiled, however, may be cleaned by rubbing lightly with a damp cloth, care being taken not to rub off any more of the natural bloom of the egg than is necessary.

In freezing weather eggs for hatching should be collected two or three times a day so as to prevent their being chilled. Broody hens allowed to sit on eggs in the nest for any considerable time are apt to hurt the hatching qualities of the eggs by causing partial incubation. Neither a hen nor an incubator will hatch strong chicks from eggs containing weak germs or from those which have not received proper care.

## NESTS FOR SITTING HENS.

When only a few hens are to be set, boys and girls will not find it necessary to provide separate quarters for the sitting hens. Of the various styles of nests for sitting hens the following is recommended: The nests should be 15 inches square, 15 inches high in back and sides, and with a board 6 inches high in front to prevent the nesting material from falling out.

Before placing the nesting material in the nest proper it is well to put from 3 to 4 inches of damp earth or a piece of grass sod in the



bottom of the nest to provide moisture. The nesting material, which may consist of hay, chaff, or straw, is then put in. Pack the nesting material down firmly and shape a circular nest slightly deeper in the center than at the edges. A nest so shaped will prevent the eggs from rolling out from under the hen and becoming chilled.



FIG. 1.—Making a nest for the sitting hen.

### HOW TO SET A HEN.

There are several ways to tell when a hen is becoming broody and wants to sit. Look into the nest and in all probability it will be seen that a few soft, downy feathers have been left there by the hen, and also that she remains on the nest longer when laying. Again, on being approached she will remain on the nest, making a clucking noise and ruffling her feathers. When one is reasonably sure that the hen is broody, and her breast feels warm to the hand, she is ready to be transferred to the nest where she is to sit and which should have been previously prepared.

At this time it is advisable to dust the hen thoroughly with insect powder. In doing so hold the hen by the feet with the head down, working the powder well into the feathers, especially those around the vent and under the wings. The sitting hen should be dusted again on or about the eighteenth day of incubation so as to be sure that there are no lice present when the chicks are hatched. Powder should also be sprinkled in the nest. Sodium fluorid may be used under the directions given in *Farmers' Bulletin 1110*.

When possible the nest should be in some out-of-the-way place where the hen will not be disturbed. Move the hen at night from the regular laying nest to the nest where she is to sit, and in doing so handle her carefully. Place a china nest egg or two in the nest where she is to sit, and place over the nest a board or a covering such as that



FIG. 2.—Dusting the sitting hen with insect powder.

shown in figure 3, so that the hen will not get off. Toward the end of the second day go quietly to where the hen is sitting, leave some feed and water, and remove the covering from the top or front of the nest, so that she can come off when ready. The best feed for the sitting hen is whole corn or wheat, or both. Should she return to the nest after feeding, remove the china egg or eggs and place in the nest the eggs that are to be incubated. The nest should be slightly darkened, as the hen is then not so likely to become restless.

In cool weather it is best not to put more than 10 eggs under a hen. Later in the spring, however, from 12 to 15 eggs can be set, according to the size of the hen.

#### CARE OF THE SITTING HEN.

When several hens are sitting in the same room they should be kept on the nests, only allowing them to come off once each day to receive feed and water. If there are any that do not voluntarily



come off the nests they should be taken off. As a rule hens will return to their nests before there is any danger of the eggs chilling, but if they do not go back in half an hour they should be put back.

Boys and girls are advised to examine and clean the nests carefully, when necessary removing all broken eggs and washing those that are soiled. When nesting material is soiled by broken eggs it should be replaced with clean straw, hay, or chaff. Nests in which eggs become broken soon become infested with mites and lice, which will cause the hens to become uneasy and leave the nest. This is likely to be the cause of the loss of valuable sittings of eggs. When a nest is infested with mites the hen, if fastened in, will often be found standing over rather than sitting on the eggs.

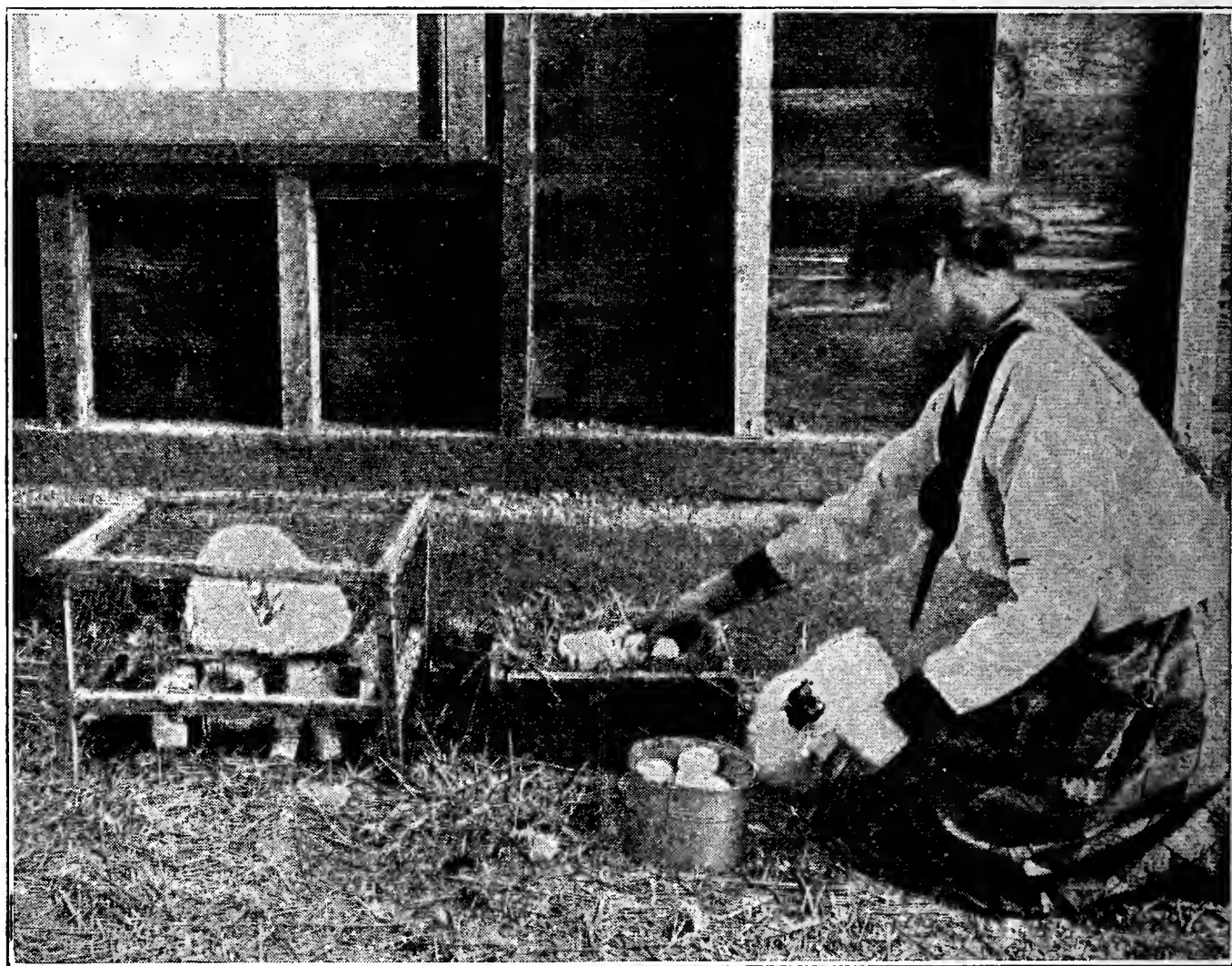


FIG. 3.—Placing the eggs in the nest for the sitting hen.

Frequently eggs that are laid late in winter or early in spring are infertile, and for that reason it is advisable to set several hens at the same time. After the eggs have been incubated for from five to seven days, the time depending somewhat on the color and thickness of the shells, they should be tested, the infertile and dead-germ eggs removed and the fertile eggs returned to the hens. Thus in many cases all the eggs remaining under several hens may be placed under one or two, and the hens from which the eggs were taken may be reset. For instance, 30 eggs are set under 3 hens at the same time; that is, 10 under each hen. At the end of 7 days, at which time the eggs should be tested, it may be found that 10 are infertile or have



dead germs, leaving only 20 fertile eggs. These 20 eggs can then be put under two hens, and a new sitting placed under the third hen.

#### METHOD OF TESTING EGGS.

All members of the poultry clubs should be thoroughly familiar with the method of testing eggs. An egg, whether fertile or not, has a small grayish spot, known as the germinal spot, on the surface of the yolk. As soon as a fertile egg is placed under a hen or in an incubator the development of the germ begins. Test all eggs at least twice during the incubation period, preferably on the seventh

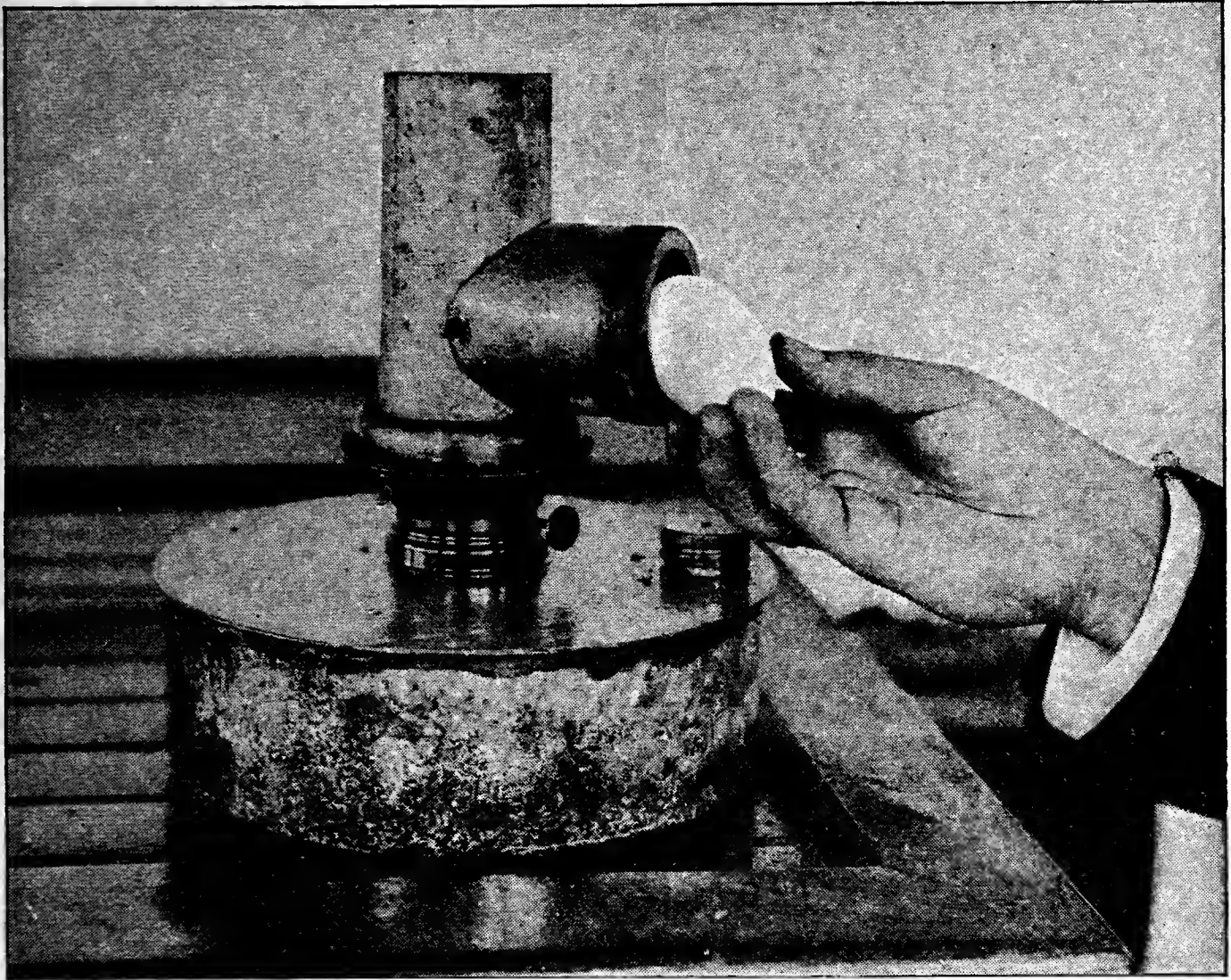


FIG. 4.—Testing an egg by the use of a metal-chimney tester which usually comes with an incubator or which can be purchased from poultry-supply houses. Such a tester can be readily fitted on an incubator lamp.

and fourteenth days. The infertile eggs and those with dead germs should then be removed. White-shelled eggs can be tested on the fourth or fifth day, whereas the development in eggs having brown shells often can not be seen by the use of an ordinary egg tester until the seventh day.

A satisfactory homemade egg tester or candler can be made with a shoe box or any other box that is large enough to hold a lamp. Cut a hole a little larger than the size of a quarter in the side of the box, so that when the lamp is placed inside the box the hole in the side will be opposite the flame. A hole should also be made in the top of the box large enough to prevent the top from catching fire from the heat of the lamp. If the chimney is long enough it should be allowed to extend through the top of the box, to allow the

heat to escape and to avoid the risk of fire. Special care should always be exercised in using kerosene lamps to prevent fire. To prevent further possibility of fire, a wooden box may be used in place of a pasteboard one, and if desired, the opening through which the chimney extends may be lined with tin or some fireproof material.

Electric or gas lamps may be used in a box with a hole, slightly smaller than an egg, cut in the side of the box and at the same level as the light. The eggs may also be tested by sunlight or daylight, using a shutter or a curtain with a small hole in it for the light to shine through.

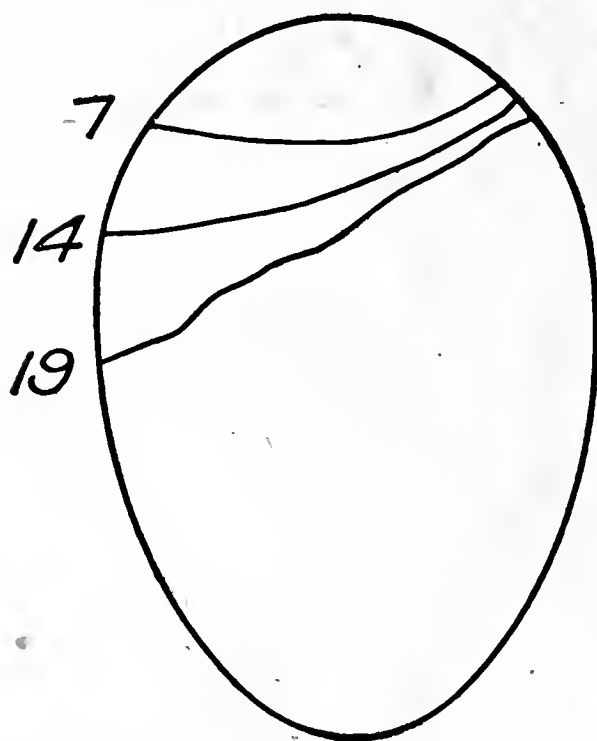


FIG. 5.—Diagram showing the air cell of an egg on the seventh, fourteenth, and nineteenth days of incubation.

The testing should be done in a dark room. To test the eggs, hold each egg with the large end up, so that the size of the air cell may be seen (see fig. 5), as well as the condition of the embryo or germ. An infertile egg when candled looks perfectly clear, the same as a fresh one, while a fertile egg shows a dark spot, known as the embryo, with a mass of little blood veins radiating in all directions. If the germ is dead and the egg has been incubated for at least 48 hours the blood settles away from the embryo toward the edges of the yolk, forming in some cases an

irregular circle of blood known as a blood ring. Eggs vary in this respect, some showing only a streak of blood.

All infertile eggs and those with dead germs should be removed at the first test. Eggs with dead germs soon decay and give off a bad odor if allowed to remain. Infertile eggs make good feed for young chickens (see Farmers' Bulletin 1108).

At the second test (on the fourteenth day) the eggs containing strong, living embryos will be dark and well filled up, showing a clear, sharp, distinct line between the air cell and the growing embryo, while eggs with dead germs will show only partial development and lack this clear, distinct outline.

### HATCHING.

The period of incubation for hens' eggs is 21 days. Usually some of the eggs hatch in the evening of the twentieth day; it sometimes happens, however, that the hatch will run over the twenty-first day, especially during cool weather.

When the eggs begin to hatch, the hen should be confined and not disturbed until the hatching is complete unless she becomes restless. In such case it is best to remove the chicks which have been hatched and keep them in some warm place until the hatch is completed. Then return all the chicks to the mother.



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